Recommended practices to organize and deliver school-based services for children with disabilities: A scoping review

Abstract

Background: Inclusive educational environments can have a positive effect on the general health and well-being of children with disabilities. However, their level of academic success and participation remains limited. Considering scarce resources and high needs, identifying efficient methods for providing interdisciplinary services is critical. This scoping review, therefore, aims to 1) synthesize current evidence about principles for organizing and delivering interdisciplinary school-based support services for students with disabilities and 2) ascertain useful strategies for implementation of principles in the school setting.

Methods: Scholarly and grey literature in rehabilitation and education were reviewed collaboratively with school-based stakeholders. A search of five databases identified 13,141 references and resulted in 56 relevant articles published from 1998 to 2017. Information (e.g., principles to organize services, strategies for implementation) was extracted and thematic analysis was used to summarize findings.

Results: Within the documents retained, 65% were scientific and 35% were grey. Services primarily targeted students with behavioural issues, followed by those with cognitive and learning disabilities with a focus on improving social-emotional functioning and academic performance. Thematic analysis revealed 10 common principles to guide service organization (e.g., collaborative interventions, support for teachers) and seven implementation strategies (e.g., training, coordination) for employing these principles.

Conclusions: Findings can guide rehabilitation professionals, educators, and policy makers in restructuring well-coordinated collaborative services involving training and capacity-building of school-based service providers. Such knowledge can contribute to the improved provision of care and, consequently, promote children's school participation and inclusion.

Authors: Anaby, D., Campbell, W., Missiuna, C., Shaw, S., Bennett, S., Khan, S., Tremblay, S., Kalubi, J.C., Camden, C., GOLDs team.

Introduction

Inclusive educational environments can have a positive impact on the health, social participation and overall well-being of children with disabilities. Students in less inclusive settings demonstrate lower levels of general health (Fisher & Meyer, 2002) and are 3.3 times more likely to encounter difficulties when interacting with peers than those in highly inclusive settings (Timmons & Wagner, 2009). While the concept of inclusion is currently well established, as over 60% of students with disabilities in North America, for instance, are integrated in regular classes (Department of Education, 2015; Gaudreau et al., 2008), many students with disabilities still experience low levels of academic success and social participation (Timmons & Wagner, 2009).

Students with disabilities attending inclusive schools can experience a multitude of challenges related to various health conditions or impairments including: motor, visual and hearing impairments, intellectual delays, pervasive developmental disorders, psychopathological conditions, language disorders, as well as related psychosocial or learning difficulties (e.g., severe behavioral problems) (Kohen, Uppal, Khan, & Visentin, 2001). These conditions, representing diverse needs, make service delivery complex, thereby increasing the demands on school organizations to provide services that are not only relevant and effective but also comprehensive. The implication of such demands on teachers' performance and stress are also substantial (Winzer & Mazurek, 2011).

Interdisciplinary professionals from the healthcare and education systems (e.g. special education, psychology, speech-language therapy, occupational therapy and personal support) are

often involved in the provision of complementary services in schools. Although funding and referral systems vary across geographical regions, similar barriers to services can be observed. Examples include long wait times for receiving care and limited knowledge translation and capacity building initiatives in school systems (Deloitte & Touche, 2010). The complexity of service delivery and the insufficient level of available services is not only recognized within the school system, but is also expressed by parents of students with disabilities, as evidenced by national surveys in both Canada (Kohen et al., 2001) and the United States (Leiter & Wyngaarden Krauss, 2004). These barriers affect students, families and school staff in need of services and can further increase discrepancies in students' health, well-being and participation (Missiuna et al., 2012).

Given that resources are limited and service needs are high, a shift in service delivery methods is required; one that moves away from costly and time-consuming individual-based interventions, towards a more general focus on capacity-building of school-based professionals, such as teachers and education assistants. This type of service provision, which includes sensitization, awareness-raising and creation of capacity-building programs to assist school staff, has been acknowledged by the World Health Organization (2011). Transferring knowledge and providing empowerment-focused interventions are considered key for chronic disease management. By emphasizing capacity-building in the context of a strong educator-therapist partnership, children with special needs may be more quickly identified, and school staff, involved in the child's immediate environment, better equipped to effectively address their challenges.

While various models of service delivery exist in the literature, such as the Partnering for Change model (Missiuna et al., 2012) and occupational based coaching (Hui, Snider, & Couture,

2016), best principles for service delivery in schools across this body of work have yet to be synthesized. A comprehensive synthesis that summarizes and compares the existing evidence regarding service delivery models, their goals, strategies and outcomes would provide clear implications and recommendations for practice and help stakeholders identify implementation strategies for inclusion in the education system. Such knowledge can guide school-based service providers in implementing evidence-based practices and effectively delivering services to students with disabilities. Thus, the purpose of this study was 1) to map and synthesize current evidence about recommended principles for organizing and delivering interdisciplinary school-based support services for students with disabilities, 2) to determine useful strategies for implementation in the school setting. Such an initiative can also reveal existing gaps in the literature, informing new lines of inquiry.

Methods

A scoping review of scholarly and grey literature in the fields of education and rehabilitation was employed following the six stages of Arksey and O'Malley's framework (2005). This method provides a broad coverage of available literature, including several study designs, with the purpose of summarizing and disseminating research findings.

Stage 1- Identifying the research question: This study aims to answer the following overarching question: *What is known about the existing school-based interdisciplinary service delivery models for students with disabilities who are integrated into the mainstream education system?*

Stage 2- Identifying relevant studies: The research team worked collaboratively with stakeholders (see stage 6) towards the development of a comprehensive search strategy to facilitate the initial search and obtain the most pertinent results. Search strategies were jointly

developed and broad keywords were identified to capture the salient concepts of service delivery models, school setting, childhood disabilities and age. To capture the concept of disability, a list of 44 types of health conditions describing a wide range of disorders such as neurological, musculoskeletal, mental and behavioral disorders, was used. This list was based on the MeSH (Medical Subject Headings) vocabulary thesaurus for each of the databases in combination with general keywords of childhood disability (e.g., "developmental disease", "disabled child". See Table 1 and Table 2 for search terms). A systematic search of peer-reviewed articles published from 1998 to 2017 was conducted using 5 databases: Medline, CINAHL, PsychINFO, ERIC and ProQuest, in addition to references suggested by stakeholders. The start date of 1998 was selected as it represents the inception of the Educational Act policy that delegates the responsibility of organizing services to individual schools and school boards (Québec, 1998).

[Insert Table 1 and Table 2]

Stage 3 – Study selection: A total of 13,141 articles were obtained following the initial search. Studies and documents, both theoretical and empirical were included if they: (1) provided specific recommendations about how to organize and deliver school-based services; and (2) focused on students under 17 years with any type of disability and socio-economic status, integrated into regular classes at preschool, elementary or high school levels. Studies were excluded if: (1) services were offered exclusively outside of school or (2) interventions were provided in a single discipline with limited information on service organization. After eliminating duplicates and excluding articles based on title and abstract, 531 articles were retained (see Figure 1). These articles were then reviewed for selection by two team members and 172 total articles were retained for full screening. Each independent reviewer was accompanied by a principal investigator for validation of selected articles, and disagreement was

resolved via ongoing discussions. An additional validation process was then conducted where all included articles as well as 20% of the excluded articles were randomly selected and reviewed by the two principal investigators. Consensus was reached through discussion.

Stage 4 - Charting the data: The data extracting and charting process was developed with input from stakeholders (see stage 6). Data, describing existing literature in terms of study purpose, year of publication, type of evidence (scientific vs. grey, theoretical vs. empirical), population (e.g., students' diagnosis, age/grade), type of schools (e.g., private, public, disadvantaged areas), other environments involved (home, community), and key players (e.g., ministry, non-governmental organization) was extracted. Details about service provision (i.e., types of services provided and by whom, characteristics of model, and implementation ideas), targeted outcomes, main findings including the impact of principles on outcomes, and methods for outcome evaluation were also extracted and charted using an Excel spreadsheet.

Stage 5- Collating, Summarizing and Reporting Results: An inductive thematic analysis following the Braun & Clarke (2006) guidelines of extracted information regarding service delivery/interventions and implementation ideas was performed. Initial codes were generated, reviewed and collated into potential themes, which were then reviewed and defined. Information was summarized and categorized to reveal the characteristics of the models (principles) and the implementation ideas (strategies). The extent to/frequency of which each principle and strategy was evident across the articles was then calculated and presented in percentages. This process was completed by two researchers and then reviewed by a principal investigator.

Stage 6- Consultation: Representatives from both the education and rehabilitation field were involved throughout the study to ensure effective synthesis, dissemination and use of knowledge. Specifically, a consultation committee made up of 11 stakeholders including directors and

school-based professionals (e.g., psychologist, special educator, pediatric counsellor, speech-language pathologist and occupational therapist) from 7 schoolboards in Quebec was created to assist in the development of search strategies and to provide input on organizing and disseminating information. Two web-based consultation meetings and one interactive survey were held at the start and near the end of the project. Representatives provided input regarding specific keywords, the use of adequate terminology, additional resources to consult and feedback on the pertinence of information in response to the knowledge needs of their stakeholder group.

Results

Fifty-six articles met the inclusion/exclusion criteria (see Figure 1). Common reasons for excluding studies were that the intervention was too specific, no professional services were offered or roles of professionals were unspecified. Of the included articles, 65% were scientific and 35% were from grey literature. Specifically, 13 were conceptual/theoretical/opinions, 22 were empirical evaluative studies, 4 were empirical descriptive studies, 3 were literature reviews, 5 were governmental documents, 6 were theses and 3 were other types of documents. Conceptual work was consistently evident (20% to 25%) throughout the years (1998-2017), whereas empirical evaluative studies were more evident in later stages as 64% of the evaluative studies were done after 2011.

[Insert Figure 1]

Most of the documents involved public schools (93%), specifically primary schools (25%), followed by those targeting both primary and high schools (18%) and high schools only (9%). Other documents targeted other age groups (e.g. pre-K, middle school) (23%) or did not specify (25%). Ten documents (18%) included disadvantaged schools or areas. While most of the evidence addressed solely the school setting (71%), only a few models have taken a broader

approach and involved other settings such as the community (15%). These include, for example, the implication of the medical system or external health agencies (Ballard, Sander, & Klimes-Dougan, 2014; Gioia, 2014). Other examples involved promoting interactions between schools, family and community (9%) such as the coordination of services (Puddy, Roberts, Vernberg, & Hambrick, 2012) or training for all individuals within the immediate environment of the child (Holmes, Levy, Smith, Pinne, & Neese, 2015).

Various professionals were involved in providing services including teachers/special education teachers (64%), rehabilitation specialists (36%) and medical staff (7%). The literature presented models that addressed different subgroups of students. The most commonly targeted populations were students with behavioral issues (23%), followed by learning disabilities/ADHD (12%) and cognitive/intellectual difficulties (12%). We identified that 27% of the models targeted all school children, with or without disabilities. These models however focused on the implementation of a program with specific objectives, such as programs to promote mental health or socially appropriate behavior (Mishna & Muskat, 2004; Puddy et al., 2012), or the use of co-educational strategies (Morocco & Aguilar, 2002; Saxon, 2007). In total, over 30 different models were identified, and several models included common characteristics. The most frequently cited model in this literature was the Response to Intervention model (RTI), a multi-tier approach to support students with learning and behavior difficulties.

Among documents targeting specific outcomes (n=33), student outcomes were the most commonly reported (evident in 27 papers) and included academic functioning and social-emotional functioning (including problem behavior management) and speech-language skills (including communication and reading skills). Several papers also targeted teacher outcomes (10

articles), such as the effect of an intervention on teacher knowledge or behavior, as well as macro outcomes at the school level (4 studies) which evaluated a model implementation.

Thematic analysis revealed 10 principles of organizing and delivering services in the school setting. Four of the principles were at the conceptual or macro level and described the global organization of services, including: multi-level services, universal design and support, collaborative intervention and coordination of service. The remaining six principles were at the micro level and informed specific service delivery, such as: supports for school staff, direct service/group-based, direct service/individual-based, pullout therapy, ecological interventions (within the child's natural environment), and family involvement. Table 3 illustrates the extent to which each principle/component was addressed within and across studies. Overall, the most common elements addressed in the literature involved the traditional individual-based direct service (39%), coordination of services (32%), support for teachers (32%) group-based direct service (31%), and collaborative intervention (29%). While study designs varied, there is some evidence, generated by 22 evaluative studies, about the impact of these principles on various outcomes with a special focus on student-related outcomes such as academic and functional abilities (behavioural, motor, cognitive).

[Insert Table 3]

Macro level principles

At the macro level, the principle of collaborative intervention involved collaboration between professionals at both the individual and the organizational level. Collaboration at the individual level included teamwork between students, teachers, non-teaching professionals (i.e., speech language pathologists), and parents, as well as teamwork during interventions and co-

teaching (Morocco & Aguilar, 2002; Ratzon et al., 2009). At the organizational level, close collaboration was observed between families, schools and school boards, and community mental health agencies (Ballard et al., 2014). Such an approach, when evaluated, (in 5 evaluative studies out of 22; 23%), was associated with students having improved social emotional functioning (Ballard et al., 2014) and improved visual-motor skills (Ratzon et al., 2009) as well as the identification of professional roles (Morocco & Aguilar, 2002) and students with difficulties (Missiuna et al., 2016).

Another frequently evaluated principle of service organization is *service coordination* (n = 8 out of 22; 36%), where the variety of services provided to students are delivered in a cohesive and organized fashion. This includes a facilitator taking on a coordination role (Davies, 2016; Shippen, Houchins, Calhoon, Furlow, & Sartor, 2006; White, LaFleur, Houle, Hyry-Dermith, & Blake, 2017), organizing on-going meetings between professionals (McIntosh, Bennett, & Price, 2011) and planning joint-management interventions (Hunt, Soto, Maier, Liboiron, & Bae, 2004).

Multi-level services entail building students' capacities by using whole-class instructional methods and interventions, and then gradually adapting or adding specific interventions according to student individual needs and their responses to previous interventions. This served as a guiding principle in providing services in 27% of the documents and included RTI models, tiered-approaches, and services adjusted to the needs of students, educators and staff. Examples of this approach include graduated supports (prevention-to-intervention) for young children with chronic conditions (Bagnato et al., 2004), adjustment to supports as children with traumatic brain injury move through the recovery process and gradual return to school (Gioia, 2014) and tiered individual remediation plans offered for middle school students with at-risk behaviour (Johnson,

2012). A multi-level service model, in combination with other principles such as teacher training (via workshops) individually or in groups, has been shown to be effective in improving teachers' management of young children through a gradual increase in the intensity of the interventions (Li-Grining, Raver, Jones-Lewis, Madison-Boyd, & Lennon, 2014). This principle was evaluated across seven studies and included tiered models targeting students' behaviours (Benedict, Horner, & Squires, 2007) by adjusting level of intervention to the needs of students (all children, small groups, and individuals).

Aspects of universal design which include prevention programs for reducing challenging behaviours were also documented in the literature (n=14), with a focus on the prevention and management of behavioural issues. This involved universal prevention programs to reduce behavioural difficulties by re-designing physical and social environments (Benedict et al., 2007), by providing universal supports that meet the needs of each school (McIntosh et al., 2011), and by promoting prevention-based health education (Henry, McNab, & Coker, 2005). It equally involved creating universal intervention programs targeting behavioural skills of an entire class (Han, Catron, Weiss, & Marciel, 2005), as well as providing prevention-to-intervention supports to accommodate the physical and behavioural needs of all students (Bagnato et al., 2004).

Micro Level Principles

At the micro level, one of the most commonly evaluated principles was support for teachers and school staff (12 evaluative studies out of 22; 55%) and included providing support to school staff in terms of mentoring, coaching, consultation and training. However, little attention was directed to teacher-related outcomes (e.g., self-efficacy, utility of new knowledge). Studies that evaluated teachers' change in proficiency indicated an improvement in teacher-related outcomes, such as an increase in their capacity (Hui et al., 2016) and knowledge (Barnett,

Corkum, & Elik, 2012; Starling & Arciuli, 2012), and improvement in student-related outcomes such as motor skills, behavior and academic achievement (Dreiling & Bundy, 2003; Han et al., 2005; Li-Grining et al., 2014; Mishna & Muskat, 2004; Strain, Wilson, & Dunlap, 2011) as well as social/interpersonal skills (Pfiffner et al., 2016). In addition, in a review study, training teaching staff was identified as a major principle associated with cost-effectiveness of early intervention programs provided in disadvantaged areas (Reynolds & Temple, 2008).

Providing ecological interventions, which refer to services provided in the child's immediate natural environment, such as in the classroom, at home and in the community, was also documented (n=15; 27%). An example of this principle involved "*in-vivo*" medical consultations and positive behaviour supports for preschoolers with chronic conditions in their home and school settings through a partnership between education and healthcare professionals and community agencies (Bagnato et al., 2004). Other examples of this principle included practicing vocational skills in a real work environment for students with emotional disorders (Nochajski & Schweitzer, 2014), weekly in-class consultations with teachers by other professionals (Han et al., 2005; Ratzon et al., 2009), practicing skills and activities related to the classroom, curriculum and specific school setting (Laverdure & Rose, 2012), and conducting dynamic assessments in the child's natural environment such as the classroom, the playground and the gymnasium (Missiuna et al., 2016; Missiuna et al., 2015). In fact, delivering services such as mental health consultations in the students' natural environment (Ballard et al., 2014) has been reported to support students both within and outside the classroom, including at lunchtime and in the playground (Groom & Rose, 2005). Evaluative studies (n = 7) that included this principle (four of them involved collaboration with an occupational/physical therapist) showed improvement in students' cognitive abilities (Ratzon et al., 2009), behaviours (Han et al., 2005),

socio-emotional functioning and the rate of school suspensions and attendance (Ballard et al., 2014). Specifically, in the Pre-K Reaching Educators, Children, and Parents (RECAP) model, a weekly, full-day in-classroom consultation for teachers on classroom-wide behaviour management alongside training for parents throughout the academic year was found effective in improving social skills and reducing problematic behaviours (measured by the Child Behaviour Checklist) of children between the ages of four and five (Han et al., 2005). An interesting example of an ecological approach was demonstrated in an article by Holmes et al. (2015) which involved creating a trauma-informed culture for preschoolers in disadvantaged settings returning to school. It included educating all staff members involved with the student (including teachers, bus drivers, cafeteria staff, administrators), on trauma such that the student's natural school environment was well informed of their condition and their needs.

Family involvement, which entails parents and family/caregivers as active team members working alongside various service providers to take on important roles in their child's health and development, was evident in 25% of the articles. These articles involved close collaboration between families, schools and mental health agencies (Ballard et al., 2014); consultative at-home support to caregivers on the medical and behavioural needs of their children (Bagnato et al., 2004); ongoing communication between families and school healthcare administrators to facilitate return to school following a brain injury (Gioia, 2014); and mentoring and training parents on the management of mental health issues (Holmes et al., 2015; Strain et al., 2011) and attention problems (Pfiffner et al., 2016). Parents' involvement as active team members amongst various service providers included taking on diverse roles, such as a leading role in case management to facilitate and monitor students' educational programs (Koskie & Freeze, 2000) and to evaluate students' performance and functioning at home (Puddy et al., 2012). In addition,

some authors also recommended intensive family support for parents of at-risk students in preschool through the third grade (Reynolds, Magnuson, & Ou, 2010).

Direct group-based service was documented in 31% of the articles and involved group interventions for children and group training for teachers and other professionals. This involved targeted small group intervention for children. These groups were an integral part of the 'tier 2' services in multi-level models (Benedict et al., 2007; O'Connor, Bocian, Sanchez, & Beach, 2014; Sayeski & Brown, 2011), and sometimes involved differentiated instruction (Missiuna et al., 2015). Supervision of small group work by teaching assistants was also documented (Groom & Rose, 2005). Further examples of group-based services also included providing group sessions to train teachers on behavioral management (Li-Grining et al., 2014), group interventions for students with learning disabilities, and group training for school staff, parents and students to increase understanding and acceptance of students with learning disabilities (Mishna & Muskat, 2004).

Pull-out therapy, in which students are withdrawn from class in order to receive services individually or in a group format, was evident in 13% of the articles. This included services for speech disorders (Bauer, Iyer, Boon, & Fore, 2010) and mental health support for students (California University, 2001; White et al., 2017). Other examples included situations where educational professionals and teaching assistants worked with students individually or in small groups to ensure progress in a specific academic area (Labon, 1999); tutors working on reading skills with groups of students outside of the classroom, monitoring the need to move from tier 2 to tier 1 (O'Connor et al., 2014); weekly direct services in pairs to improve visual-motor skills, provided by an occupational therapist (Ratzon et al., 2009); and a range of out-of-class small group services to improve positive interactions with peers and teachers (Saxon, 2007).

Direct individual-based service, which involves direct specialized interventions for students with complex conditions, was the most commonly documented principle in the literature (39%). This included specialized occupational therapy services (Hutton, Tuppeny, & Hasselbuch, 2015), on-going direct support provided daily by various professionals to students with complex conditions (MELS, 2007) and individual interventions provided for students at the tier 3 level (Benedict et al., 2007; Johnson, 2012; NRCLD, 2007; Sayeski & Brown, 2011). Other examples included direct student-focused services provided in class by an occupational therapist (Dreiling & Bundy, 2003), direct services provided by teaching assistants (Groom & Rose, 2005), intensive individual trauma-related interventions (Holmes et al., 2015), individual therapy for children with severe emotional disorders (Puddy et al., 2012), and one-on-one tutoring (Shippen et al., 2006). It also included individual plans developed through a transdisciplinary team approach (Koskie & Freeze, 2000), direct mental health consultation services for children, stress reduction services for teachers (Li-Grining et al., 2014), and direct services to support the transition to the workplace for high school students with emotional and behavioral disorders (Nochajski & Schweitzer, 2014).

It is important to note that each service organization component or principle has been evaluated in combination with other components/principles, rather than separately. In fact, most evaluative studies used a combination of at least three principles. To illustrate this, a service delivery model that targeted pre-school children with trauma-related disorders in disadvantaged areas involved support (e.g., skill development in the form of training) for teachers and all school staff (i.e. bus drivers, receptionists, administrators) as well as training for family members, in combination with multi-level services and direct intensive, individual-based interventions (Holmes et al., 2015). The study demonstrated effective outcomes for students, but it is difficult

to estimate the contribution of each of the principles in isolation. Another model that included multiple components is the Partnering for Change model which promotes ecological interventions and multi-level services including universal design. This model has facilitated equal and effective access to services for children (Missiuna et al., 2015) and was found effective in reducing waitlists for services for all children (Missiuna et al., 2016).

Seven implementation strategies that were used to facilitate the uptake of identified models and principles in the school setting were evident in 24 documents. The most common strategies included training (42%), designating a coordination role (29%), meetings (25%) internal support (21%) preparation (13%), external support (13%) and continuous evaluation (8%). Most documents used a single strategy (71%) and a few used a combination of two to four strategies (29%). Teacher and school staff training involved various modalities such as workshops (Hyter, 2003), ongoing mentoring sessions (Hui et al., 2016), web-based platforms for information exchange (Barnett et al., 2012), online video training (Gioia, 2014) and written materials such as books, graphs and fact sheets, among others. The role of coordinator is a leadership role that can involve external mentors (McIntosh et al., 2011) who provide continuous communication (Bagnato et al., 2004), develop connections with rehabilitation centres or hospitals (Davies, 2016) and facilitate peer consultation (Mishna & Muskat, 2004), implementation of leadership teams (McIntosh et al., 2011), or resource utilization mechanisms (California University, 2001).

Discussion

This study aimed to synthetize best practices for organizing service delivery in the school setting for students with disabilities who are included in regular classrooms. The findings identified a variety of service delivery models used in the school setting, aimed at different

populations and for students with diverse conditions. While models varied, common principles across all models were evident.

The macro level principles identified in this study can guide educators and healthcare providers in conceptually organizing services within a global or systemic framework. Alongside micro level principles, these can inform the specific approach to delivering intervention. As such, different macro and micro level principles can be combined to develop a new model of service delivery customized to the context and needs of each organization. Since models were effective when at least three principles were used, it is important to rely on a combination of principles rather than isolated components when designing a new model. The ten principles identified can also be used to validate, refine and expand existing models to ensure service delivery is evidence-based and meets the key expectations of inclusive education policies. Finally, these principles can be incorporated into university/college curricula in the field of education and rehabilitation, thereby educating future teachers and practitioners on effective methods for delivering services for students of all abilities.

While some of the identified principles are well-known (e.g., pull-out therapy, direct individual-based services), this review revealed unique and innovative principles, such as providing ecological interventions and promoting family involvement. Such principles coincide with emerging therapeutic approaches in pediatric rehabilitation that are context-based and family-centered, both of which have proven effective in promoting children's function and participation (Anaby, Law, Feldman, Majnemer, & Avery, 2018; Law et al., 2011).

Beyond designing a service delivery model, it is important to utilize effective strategies to implement those principles. The most common implementation strategy identified was training and information exchange, which can facilitate the implementation of, for instance, the principle

of *support for teachers and school staff*. This further supports emerging capacity-building, cost-effective models that aim to empower and increase competence of school-based personnel through knowledge translation and coaching (e.g., Partnering for Change) (Missiuna et al., 2012).

Several gaps were identified in the literature. No single model that comprehensively addressed the needs of all children with disabilities was identified. However, a set of principles emerged which can guide model development that is tailored to the needs of each school. Most of the existing models targeted students with behaviour issues, with little attention to physical or motor impairments. Further research should include a wide range of functional issues and health conditions for a more comprehensive understanding of the integration and inclusion of all populations. Such inquiries can contribute to the emerging call for service delivery models that are applicable for all children, also known as population-based services (Missiuna et al., 2015), providing support to all students across a range of diagnostic categories or needs. While ten guiding principles were found, they were not evaluated independently. Thus, it cannot be concluded that one principle is more important than the other. Future studies can apply rigorous methods to compare the relative effectiveness across different principles (e.g.: pull-out vs. ecological), as well as conduct a cost-effective analysis. Although the principle of training teachers and school staff was the most commonly evaluated, outcomes rarely focused on aspects of the teacher in terms of competency, self-efficacy, knowledge use, or attitudes. Focusing only on student outcomes may not capture all relevant successes of the implemented model. It is recommended that future studies include student, teacher and family related outcomes, as well as administrative outcomes.

This study has some limitations. As is typical in scoping reviews, the quality of the evidence was not evaluated due to the large variety of study designs and, in this case, the inclusion of grey literature. However, this does not permit the formulation of a firm conclusion about articles that did evaluate the effectiveness of principles for organizing and delivering services. This review focused solely on elementary and high school students. Additionally, the exclusion of documents that involved specific interventions delivered by a single discipline may have resulted in the omission of models that may have system-level implications. While this study was done in collaboration with a range of stakeholders, they were all province-based representatives, and neither national nor international leaders were consulted. This may have affected the results, directing attention to local sources of information including governmental documents and protocols.

In conclusion, this synthesis revealed a range of principles and implementation strategies that can help develop a service organization model for students with disabilities included in regular classrooms, thereby promoting the uptake of effective inclusive educational services and policies. Principles include multi-level and collaborative intervention service approaches that promote knowledge exchange and capacity building for everyone involved in the child's environment (parents, health professionals, teachers, school staff) with training and the integration of well-coordinated partnerships between education, health services and financial entities.

Key Messages

- This synthesis identified common principles and strategies to guide the development and redesign of effective service delivery models for children with disabilities integrated in regular classrooms.
- Models which encompass a combination of principles, rather than isolated components, hold promise in delivering effective services.
- Further attention can be given to students with other types of disabilities, such as physical or motor impairments.

References

Anaby, D., Law, M., Feldman, D., Majnemer, A., & Avery, L. (2018). The effectiveness of the Pathways and Resources for Engagement and Participation (PREP) intervention: improving participation of adolescents with physical disabilities. *Developmental Medicine and Child Neurology, 60*(5), 513-519. doi:10.1111/dmcn.13682

Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology, 8*(1), 19-32. doi:10.1080/1364557032000119616

Bagnato, S. J., Blair, K., Slater, J., McNally, R., Mathews, J., & Minzenberg, B. (2004). Developmental healthcare partnerships in inclusive early childhood intervention settings: the HealthyCHILD model. *Infants & Young Children: An Interdisciplinary Journal of Early Childhood Intervention, 17*(4), 301-317.

Ballard, K. L., Sander, M. A., & Klimes-Dougan, B. (2014). School-related and social-emotional outcomes of providing mental health services in schools. *Community Mental Health Journal, 50*(2), 145-149. doi:10.1007/s10597-013-9670-y

Barnett, B., Corkum, P., & Elik, N. (2012). A web-based intervention for elementary school teachers of students with attention-deficit/hyperactivity disorder (ADHD). *Psychological Services, 9*(2), 227-230. doi:10.1037/a0026001

Bauer, K. L., Iyer, S. N., Boon, R. T., & Fore, C., III. (2010). 20 Ways for Classroom Teachers to Collaborate with Speech-Language Pathologists. *Intervention in School and Clinic, 45*(5), 333-337.

Benedict, E. A., Horner, R. H., & Squires, J. K. (2007). Assessment and Implementation of Positive Behavior Support in Preschools. *Topics in Early Childhood Special Education, 27*(3), 174-192.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology, 3*(2), 77-101.

California University, L. A. C. f. M. H. i. S. (2001). *Mental Health in Schools: Guidelines, Models, Resources, & Policy Considerations*.

Davies, S. C. (2016). School-base traumatic brain injury and concussion management program *Psychology in the Schools, 53*(6), 567-582.

Deloitte, & Touche, L. (2010). Review of school health support services final report.

Department of Education, U. S. (2015). *Elementary and Secondary Education*. Digest of Education Statistics Retrieved from https://nces.ed.gov/programs/digest/d15/tables/dt15_204.60.asp.

Dreiling, D. S., & Bundy, A. C. (2003). A comparison of consultative model and direct-indirect intervention with preschoolers. *The American Journal Of Occupational Therapy: Official Publication Of The American Occupational Therapy Association, 57*(5), 566-569.

Fisher, M., & Meyer, L. H. (2002). Development and social competence after two years for students enrolled in inclusive and self-contained educational programs. *Research and Practice for Persons with Severe Disabilities, 27*(3), 165-174.

Gaudreau, L., Legault, F., Brodeur, M., Hurteau, M., Dunberry, A., Séguin, S.-P., & Legendre, R. (2008). *Rapport d'évaluation de la politique d'adaptation scolaire au Québec*. Retrieved from Montréal:

Gioia, G. A. (2014). Medical-School Partnership in Guiding Return to School Following Mild Traumatic Brain Injury in Youth. *Journal Of Child Neurology*.

Groom, B., & Rose, R. (2005). Supporting the Inclusion of Pupils with Social, Emotional and Behavioural Difficulties in the Primary School: The Role of Teaching Assistants. *Journal of Research in Special Educational Needs, 5*(1), 20-30.

Han, S. S., Catron, T., Weiss, B., & Marciel, K. K. (2005). A Teacher-Consultation Approach to Social Skills Training for Pre-Kindergarten Children: Treatment Model and Short-Term Outcome Effects. *Journal of Abnormal Child Psychology, 33*(6), 681-693. doi:10.1007/s10802-005-7647-1

Henry, J., McNab, W., & Coker, J. K. (2005). The School Counsellor: An Essential Partner in Today's Coordinated School Health Climate. *Guidance & Counselling, 20*(3-4), 102-108.

Holmes, C., Levy, M., Smith, A., Pinne, S., & Neese, P. (2015). A Model for Creating a Supportive Trauma-Informed Culture for Children in Preschool Settings. *Journal Of Child And Family Studies, 24*(6), 1650-1659.

Hui, C., Snider, L., & Couture, M. (2016). Self-regulation workshop and Occupational Performance Coaching with teachers: A pilot study. *Canadian Journal of Occupational Therapy, 83*(2), 115-125.

Hunt, P., Soto, G., Maier, J., Liboiron, N., & Bae, S. (2004). Collaborative Teaming to Support Preschoolers With Severe Disabilities Who Are Placed in General Education Early Childhood Programs. *Topics in Early Childhood Special Education, 24*(3), 123-142.

Hutton, E., Tuppeny, S., & Hasselbuch, A. (2015). Making a case for universal and targeted children's occupational therapy in the United Kingdom. *British Journal of Occupational Therapy, 1*(4).

Hyter, Y. D. (2003). Language Intervention for Children with Emotional or Behavioral Disorders. *Behavioral Disorders, 29*(1), 65-76.

Johnson, J. H. (2012). *The Implementation of the Full Service School Reform Model and Its Impact on Middle School Climate and Student Achievement: An Investigative Study.* ProQuest LLC. Available from EBSCOhost

Kohen, D., Uppal, S., Khan, S., & Visentin, L. (2001). *Access and Barriers to Educational Services for Canadian Children with Disabilities*. Retrieved from

Koskie, J., & Freeze, R. (2000). A critique of multidisciplinary teaming: Problems and possibilities. *Developmental Disabilities Bulletin, 28*(1), 1-17.

Labon, D. (1999). *Inclusive Education at Work: Students with Disabilities in Mainstream Schools*.

Laverdure, P. A., & Rose, D. S. (2012). Providing educationally relevant occupational and physical therapy services. *Physical & Occupational Therapy In Pediatrics, 32*(4), 347-354. doi:10.3109/01942638.2012.727731

Law, M. C., Darrah, J., Pollock, N., Wilson, B., Russell, D. J., Walter, S. D., . . . Galuppi, B. (2011). Focus on function: a cluster, randomized controlled trial comparing child- versus context-focused

intervention for young children with cerebral palsy. *Developmental medicine and child neurology, 53*(7), 621-629.

Leiter, V., & Wyngaarden Krauss, M. (2004). Claims, barriers, and satisfaction: Parents' requests for additional special education services. *Journal of Disability Policy Studies, 15*(3), 135-146.

Li-Grining, C. P., Raver, C. C., Jones-Lewis, D., Madison-Boyd, S., & Lennon, J. (2014). Targeting Classrooms' Emotional Climate and Preschoolers' Socioemotional Adjustment: Implementation of the Chicago School Readiness Project. *Journal of Prevention & Intervention in the Community, 42*(4), 264-281. doi:10.1080/10852352.2014.943639

McIntosh, K., Bennett, J. L., & Price, K. (2011). Evaluation of Social and Academic Effects of School-Wide Positive Behaviour Support in a Canadian School District. *Exceptionality Education International, 21*(1), 46-60.

MELS. (2007). *L'organisation des services éducatifs aux élèves à risque et aux élèves handicapés ou en difficulté d'adaptation ou d'apprentissage (EHDAA)*. Retrieved from http://www.education.gouv.qc.ca/fileadmin/site_web/documents/dpse/adaptation_serv_compl/19-7065.pdf.

Mishna, F., & Muskat, B. (2004). School-Based Group Treatment for Students with Learning Disabilities: A Collaborative Approach. *Children & Schools, 26*(3), 135-150. doi:10.1093/cs/26.3.135

Missiuna, C., Pollock, N., Campbell, W., DeCola, C., Hecimovich, C., Sahagian Whalen, S., . . . Camden, C. (2016). Using an innovative model of service delivery to identify children who are struggling in school. *British Journal of Occupational Therapy, 80*(3), 145-154. doi:10.1177/0308022616679852

Missiuna, C., Pollock, N., Campbell, W., Dix, L., Whalen, S., & Stewart, D. (2015). Partnering for Change: Embedding universal design for learning into school-based occupational therapy. *Occupational Therapy Now, 17*.

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Whalen, S. D. S., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An Innovative School-Based Occupational Therapy Service Delivery Model for Children with Developmental Coordination Disorder. *Canadian Journal of Occupational Therapy, 79*(1), 41-50. doi:10.2182/cjot.2012.79.1.6

Morocco, C. C., & Aguilar, C. M. (2002). Coteaching for content understanding: A schoolwide model. *Journal of Educational & Psychological Consultation, 13*(4), 315-347. doi:10.1207/S1532768XJEPC1304_04

Nochajski, S. M., & Schweitzer, J. A. (2014). Promoting school to work transition for students with emotional/behavioral disorders. *Work (Reading, Mass.), 48*(3), 413-422. doi:10.3233/WOR-131790

NRCLD. (2007). *Responsiveness to Intervention in the SLD Determination Process*. Retrieved from

O'Connor, R. E., Bocian, K. M., Sanchez, V., & Beach, K. D. (2014). Access to a Responsiveness to Intervention Model: Does Beginning Intervention in Kindergarten Matter? *Journal of Learning Disabilities, 47*(4), 307-328.

Organization, W. H. (2011). EducationWorld Report on Disability (pp. 203-227): World Health Organization. Retrieved from http://www.who.int/disabilities/world_report/2011/chapter7.pdf.

Pfiffner, L. J., Rooney, M., Haack, L., Villodas, M., Delucchi, K., & McBurnett, K. (2016). A Randomized Controlled Trial of a School-Implemented School-Home Intervention for Attention-Deficit/Hyperactivity Disorder Symptoms and Impairment. *ournal of American Academy of Child & Adolescent Psychiatry, 55*(9), 762-770. doi:10.1016/j.jaac.2016.05.023

Puddy, R. W., Roberts, M. C., Vernberg, E. M., & Hambrick, E. P. (2012). Service Coordination and Children's Functioning in a School-Based Intensive Mental Health Program. *Journal of Child and Family Studies, 21*(6), 948-962.

Québec. (1998). *Education Act - Functions and powers related to educational services provided in schools*. Retrieved from Québec Goverment http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=/I_13_3/I13_3_A.html

Ratzon, N. Z., Lahav, O., Cohen-Hamsi, S., Metzger, Y., Efraim, D., & Bart, O. (2009). Comparing Different Short-Term Service Delivery Methods of Visual-Motor Treatment for First Grade Students in Mainstream Schools. *Research in Developmental Disabilities: A Multidisciplinary Journal, 30*(6-), 1168-1176.

Reynolds, A. J., Magnuson, K. A., & Ou, S.-R. (2010). Preschool-to-third grade programs and practices: A review of research. *Children and Youth Services Review, 32*(8), 1121-1131. doi:10.1016/j.childyouth.2009.10.017

Reynolds, A. J., & Temple, J. A. (2008). Cost-effective early childhood development programs from preschool to third grade. *Annual Review of Clinical Psychology, 4*, 109-139. doi:10.1146/annurev.clinpsy.3.022806.091411

Saxon, K. M. (2007). *Integrating students with disabilities into the general education classroom: An ethnographic study on two service delivery models.* (3301804 Ph.D.), Boston College, Ann Arbor. Retrieved from http://search.proquest.com/docview/304897623?accountid=12339 http://mcgill.on.worldcat.org/atoztitles/link?sid=ProQ:&issn=&volume=&issue=&title=Integrating+students+with+disabilities+into+the+general+education+classroom%3A+An+ethnographic+study+on+two+service+delivery+models&spage=&date=2007-01-01&atitle=Integrating+students+with+disabilities+into+the+general+education+classroom%3A+An+ethnographic+study+on+two+service+delivery+models&au=Saxon%2C+Karyn+M.&id=doi: ProQuest Dissertations & Theses Full Text database.

Sayeski, K. L., & Brown, M. R. (2011). Developing a Classroom Management Plan Using a Tiered Approach. *TEACHING Exceptional Children, 44*(1), 8-17.

Shippen, M. E., Houchins, D. E., Calhoon, M. B., Furlow, C. F., & Sartor, D. L. (2006). The Effects of Comprehensive School Reform Models in Reading for Urban Middle School Students with Disabilities. *Remedial and Special Education, 27*(6-), 322-328.

Starling, M. T., & Arciuli. (2012). Training secondary school teachers in instructional language modification techniques to support adolescents with language impairment: a randomized controlled trial. *Language, speech, and hearing services in schools, 43*, 474-495.

Strain, P. S., Wilson, K., & Dunlap, G. (2011). Prevent-Teach-Reinforce: Addressing Problem Behaviors of Students with Autism in General Education Classrooms. *Behavioral Disorders, 36*(3), 160-171.

Timmons, V., & Wagner, M. (2009). *Inclusive Education Knowledge Exchange Initiative: An Analysis of the Statistics Canada Participation and Activity Limitation Survey*. Retrieved from http://www.cclcca. ca/CCL/Research/FundedResearch/201009TimmonsInclusiveEducation.html

White, H., LaFleur, J., Houle, K., Hyry-Dermith, P., & Blake, S. M. (2017). Evaluation of a school-based transition program designed to facilitate school reentry following a mental health crisis or psychiatric hospitalization. *Psychology in the Schools, 54*(8), 868-882.

Winzer, M., & Mazurek, K. (2011). Canadian Teachers' Associations and the Inclusive Movement for Students with Special Needs. *Canadian Journal of Educational Administration and Policy, 116*, 1-24.